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EDITOR

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First Assistant

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The New York Botanical Garden

VOL. VII. November, 1906. No. 83.

RECENT EXPLORATIONS IN JAMAICA.

TO THE SCIENTIFIC DIRECTORS,

Gentlemen: — By permission of Mr. D. O. Mills, President of the Board of Managers of the Garden, I devoted the period between August 25 and October 1 to botanical exploration in the island of Jamaica, taking advantage of the kind invitation of the Hon. William Fawcett, Director of the Public Gardens and Plantations, to visit the island. I was accompanied by Mrs. Britton, by Professor L. M. Underwood, Chairman of the Scientific Directors of the Garden, and by Miss Delia W. Marble. Professor Alexander W. Evans of Yale University and his assistant, Mr. Nichols, were with us part of the time.

Although much is known of the flora of Jamaica, considerable areas of the island have been only imperfectly explored, and some of the regions accessible only with difficulty and by the expenditure of much time, have not yet been visited by botanists. One object of the expedition was to determine upon the most practicable plans for reaching these unexplored regions, the most noteworthy of which are the so-called Cockpit Country, in the west central part of the island, and the John Crow mountains at the extreme eastern end.

We spent a week in the eastern edge of the Cockpit Country, centering at Troy and at Balaclava, under the guidance of Mr. William Harris, Superintendent of Public Gardens and Plantations of Jamaica, who had previously made several trips to this

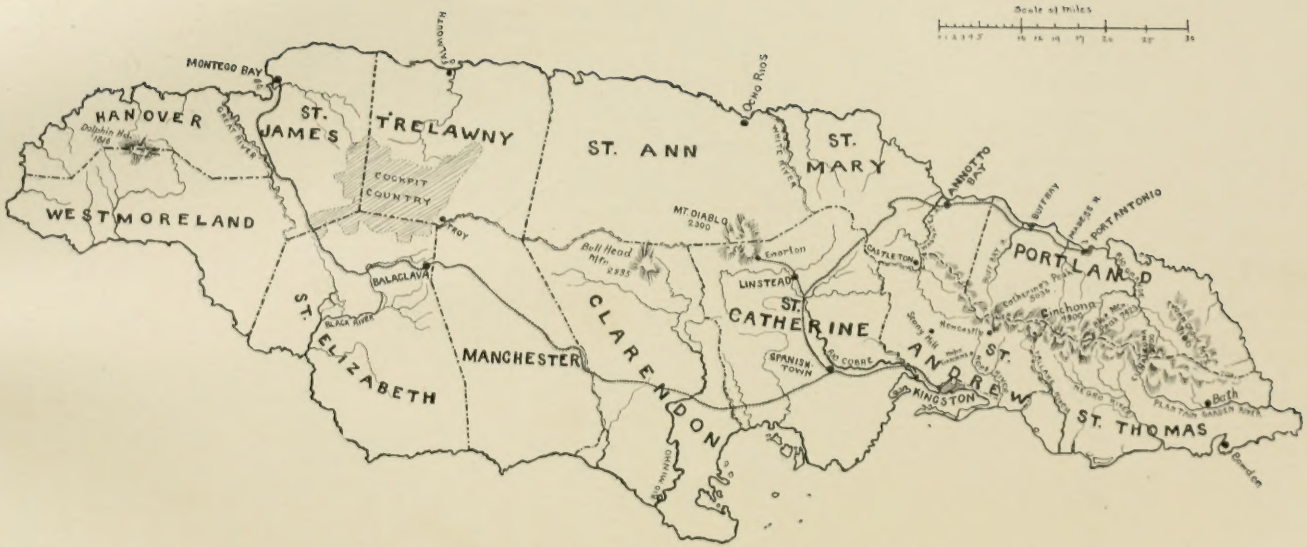

FIG. 43. Map of Jamaica.

region and penetrated farther into it than any other botanist had been able to do. During these trips he has made extensive botanical collections, including many species of trees and shrubs new to science; his work of collecting has been carried on for several years in coöperation with the Garden, and we have received from his department a complete series of all the plants secured; he led me to many of the novelties found by him, and we secured additional specimens of them; we also detected a number of other new species, including some of great interest. The region is a very rough one physiographically, consisting of a very porous limestone eroded into characteristic hills and deep hollows, the ragged edges of the rocks making passage through it, except on the few roads and trails, exceedingly difficult and necessarily slow to avoid dangerous tumbles; it has a general elevation of some 2,000 feet above the sea, its highest hills said to reach 2,700 feet, and its climate is delightful; naturally, it is very sparsely populated; we concluded that its complete exploration could only be accomplished by means of a pack-train and camp outfit, using existing trails and penetrating laterally from them as far as possible on foot; there is no doubt that this method would bring out many additional novelties, as the distribution of plants there is very local, and I hope it may be accomplished before some of them are lost to science by the somewhat irresponsible cutting of timber which is now going on.

A week was given to collecting in the higher portions of the Blue Mountains, using Cinchona, the Garden's subtropical station and laboratory as a base, and the party enjoyed while there the delightful hospitality and kindly aid of Mrs. William Fawcett, wife of the Director of Public Gardens and Plantations. Expeditions were made to the summit of Sir John Peak, the second highest mountain of the range, along a trail recently cut out by means of contributions of students who have used the laboratory, which opens up a surprisingly interesting tract of mountain forest at altitudes of 6,000 to 7,000 feet. Here the bryologists of the expedition revelled in the wealth of rare mosses and liverworts which clothed the tree-trunks, the shrubs and the ground, forming cushions and festoons of entrancing beauty; in spite of a

tropical down-pour of rain, which finally drove us to shelter in a hut three or four miles from the summit where a fire and hot coffee soon made everybody cheerful, and the return to Cinchona was made without incident and the collections safely housed. John Crow Peak, a much better known mountain of 6,000 feet altitude, was also visited, and extensive collections made there and at lower altitudes.

The buildings and grounds at Cinchona, leased by the Garden from the Jamaican government in 1903, for use as a subtropical station and laboratory have been repeatedly described ; I had not visited them before, however, and was naturally much interested in examining the establishment, which is all that is necessary for the purposes ; the buildings have been kept in repair and the grounds in good order by the Jamaican government. Professor Underwood will present to you a detailed report on the work hitherto accomplished by students at Cinchona, together with considerations relative to the future of the station. A v sit of about three days was made to Hollymount, near Mount Diablo in the central part of the island, where collections were made, and, under the guidance of Mr. Harris, I was able to study and collect at several points in the vicinity of Kingston, in the part of the island which has the least rainfall, and where cacti abound. Through his collections and my own we have now secured living specimens of all the cacti known to grow in Jamaica, except one small and little known species ; this is a *Mamillaria*, accredited to Jamaica by Linnaeus, but not found there in many years ; it is especially interesting as the type of the genus *Mamillaria*, mostly globose plants, so rich in species in Mexico and in the arid portions of Arizona and New Mexico : I greatly desired to rediscover it, having found the related species *Mamillaria nivosa* on Culebra Island, Porto Rico, last spring, and hope that the Jamaica botanists may yet run across it. The largest Jamaica cactus is the plant known as *Cereus Swartzii*.

The Jamaica palms were also made a subject of special study, and I was fortunate in being able to see nearly all the kinds known and to collect herbarium specimens ; seeds and young plants of several of them were also obtained ; the most remark-

able of them is a fan-thatch species, presumably of the genus *Thrinax*, abundant in the woods covering the limestone hills about Hollymount, which reaches a height of 50 feet with a trunk only about 6 inches in diameter ; its flowers and fruit are unknown to botanists, and are apparently produced only sparingly and at long intervals ; examination of several hundred trees failed to reveal them, and other botanists have had a like experience, but the old fruit-stalks seen on several trees prove that they do occur at times. Another very interesting species of *Thrinax* grows in great quantities at the mouth of Priestman's River at the extreme northeastern part of the island ; this is a small tree, none seen by us being over 15 feet high, having large clusters of stalked milk-white fruits nearly half an inch in diameter. The largest native palm on the island is the cabbage-palm, the trunk of which sometimes reaches a height of 100 feet ; the royal-palms of Cuba and Porto Rico do not grow naturally in Jamaica, but are freely planted for ornament. In order to study the plants of the wettest part of the island we traversed the region from Port Antonio eastward to Priestman's River, fortunately on a day with insignificant rainfall ; this brought us to a view of the John Crow Mountains, the other region which I have referred to as least known botanically, but we did not get within five or six miles of the range ; inquiries indicate that the pack-train method will be the only satisfactory way of exploring them.

Parts of several days were spent at the public gardens at Hope, in studying the plantations and herbarium ; Mr. Harris very obligingly gave us great assistance here, allowing us to prepare and pack all our collections, and arranging for their shipment ; and to this coöperation much of the success of the expedition is due.

In addition to its function as a public garden and park, Hope is a very important center of botanical and horticultural investigation, serving also as an agricultural experiment station.

The public garden at Castleton located near the center of the island was also visited and the plantations studied with much interest and profit ; this is in a very wet region, permitting the

growth of very many plants not adapted to the much drier climate at Hope; and a very notable collection of economic tropical trees from all parts of the world has been brought together here, including probably the most complete series of palms to be found anywhere in America, all in fine condition.

The collections of prepared specimens and of living plants made during the expedition include about 1,600 numbers, aggregating some 5,000 specimens, and are an important addition to our representation of West Indian species, the duplicates being available for exchanges; some valuable plants from the gardens at Hope and at Cinchona were also obtained.

Our thanks are gratefully tendered to His Excellency Sir Alexander Swettenham, Governor of Jamaica, to the Hon. William Fawcett, Director of Public Gardens and Plantations, and to Mr. William Harris, Superintendent of Public Gardens and Plantations.

Respectfully submitted,

N. L. Britton,

Director-in-Chief.

A REPORT ON THE CONDITION OF THE TROPICAL LABORATORY.

To the Board of Scientific Directors,

Gentlemen: — It is now just ten years since serious agitation was first aroused among American botanists relative to a tropical Botanical Laboratory. Commencing in November, 1896, the Botanical Gazette published a series of editorials on the subject * and a commission was appointed to consider Jamaica with special reference to such an establishment, two of the members of the commission actually visiting the island early in 1897. For various reasons the interest waned, and no further steps were taken until, in response to the suggestion of the present writer,† the

* Botanical Gazette, **22**: 415–416, 494–495. 1896; **23**: 47–48, 126–127, 202–203. 1897. *Cf.* also letters on the subject in the same journal, **22**: 496–497. 1896; and **23**: 50–51, 54, 129, 207–208, 291. 1897.

† *Cf.* Journal N. Y. Bot. Gard. **4**: 109–119. 1903.

buildings at Cinchona were leased from the Jamaican government by the New York Botanical Garden for the period of ten years from August, 1903, and thus an outfit practically ready for occupancy was secured where American botanists could take advantage of all needed facilities for tropical work under the most favorable circumstances.

Cinchona takes its name from the extensive plantations of that tree which were installed by the Jamaican government over forty years ago with the intention of producing its drug on a commercial scale. So far as leased by the Garden, Cinchona consists of a six-room house with accessory kitchen, store-room, and stable, three office buildings suitable for dormitories and capable of housing eight or ten people in addition to the house proper with its four large sleeping apartments, two low green-houses sufficient for cultivation under glass of such plants as require more moisture than that afforded by the outside atmosphere, and two laboratories large enough to accommodate nearly a dozen workers. These buildings form the greater part of the government experiment station established in 1874, which under Sir Daniel Morris (1879–1886) and later (1886–1897) under the Hon. William Fawcett was the residence of the government botanist and the center of botanical work in the island. The physical, climatic, and floral conditions at Cinchona, as well as the sanitary conditions of the location, demand attention as forming the real basis for recommendation as a tropical laboratory where students accustomed to a more temperate climate may desire to study for a longer or shorter period. These may be summarized topically :

1. *Location.* — Cinchona is located on a spur of the Blue Mountain range on the southern (xerophytic) exposure at an elevation of 4,950 feet above the sea. It is most easily reached from Kingston *via* Gordontown which is connected with Kingston by one of Jamaica's splendid carriage roads, and from which two good bridle paths lead to Cinchona either over Content Gap or past Guava Ridge. A driving road from Buff Bay on the north coast reaches Silver Hill Gap seven miles from Cinchona and is in process of construction to Chestervale three miles nearer.

2. *Climate.* — A daily record of the temperature, condition of the atmosphere, and rainfall, has been kept for the past twenty-five years, and from the published data we learn that the temperature ranges from about 47° to 74° F., rarely exceeding these limits. The rainfall is about 50 inches, being of course much less than on the northern slope of the range where it locally reaches 100–200 inches, though much more than at the really xerophytic portion of the island in the vicinity of Kingston. In general, the month of May and some part of the period from September to November include the principal rainy seasons so-called.

3. *Sanitary Conditions.* — For ordinary domestic purposes, rain-water, accumulated in three large cisterns, furnishes an adequate supply. For drinking purposes and for cooking, water is brought from the source of the Clyde river which forms here a large limpid brook rising about six hundred feet below Cinchona. This water is cold, clear, and as nearly absolutely pure as natural water derived from the earth could possibly be. There being no residence other than Cinchona higher than the sources of the stream and no cultivation even above its watershed, there are absolutely no sources of contamination.

From a residence at Cinchona at three different periods of the year, January-February, 1903, April, 1903, and September, 1906, the writer can personally testify as to the healthfulness and desirability of the location. When we add to an ideal climate, the rugged mountain scenery of Jamaica which is spread out in every direction, with the harbor of Port Royal and the golden Caribbean nearly a mile below, the magnificent and ever-changing cloud effects, now above, now below the observer — and about him a well-ordered tropical garden (still maintained as a public garden by the Jamaican government), with tall *Eucalyptus*, *Grevillea*, *Juniperus* and *Podocarpus* trees, with tree-ferns and many other tropical plants, and with a wide variety of magnificent rose bushes blossoming at every season, we have a picture where "every prospect pleases" and where every feature appeals to the esthetic sense and contributes in a marvellous degree to the real pleasure and contentment of living.

4. *Flora.* — The botanical features of Jamaica are very rich and diversified. In 1893 Mr. Fawcett compiled a list of Jamaica plants largely from Grisebach's Flora of the British West Indies (1864) which enumerated about two thousand species of seed-bearing plants. To this list the persistent field work of Mr. William Harris has added nearly a fourth more. As is well known, the ferns and their allies form an unusual ratio to the seed-bearing plants and Jamaica possesses more species of these groups than any other equivalent area of the entire world. These were studied by the late Mr. Jenman, whose collection became the property of the Garden in 1903. With the later additions made to Jenman's work the number of species exceeds five hundred, or perhaps one-sixth of the higher flora, and at least two-thirds of these are found within a radius of ten miles with Cinchona as a center. The mosses are abundant and some grow in the greatest profusion in the higher altitudes; they have only recently been studied with any degree of thoroughness. The same may be said of the hepatics, of which probably a greater number exist than of the true mosses. Lichens are abundant and have been only partially studied. The algae which swarm in the tropical waters of the coast have been partially collected and have been listed by Mr. F. S. Collins, yet this group awaits further study. Of all the groups of plants the fungi alone seem to be deficient in number of species as compared with temperate regions, although no very serious mycological work has yet been done in the island. Within easy reach of Cinchona we find abundance of original forest conditions. Naturally shrubs and trees form the larger portion of the terrestrial element of the higher plants, while epiphytic bromeliads, orchids, and aroids, parasitic Loranthaceae and succulent Piperaceae and Urticaceae exist in great profusion. The Eusporangiate ferns are represented by *Marattia* and several species of *Danaea*, and by three genera of Ophioglossaceae; six species of Gleicheniaceae form thickets at the higher elevations wherever land had once been cleared; the moist woods beyond the divide abound in numerous representatives of Jamaica's large array of endemic tree-ferns, and filmies (Hymenophyllaceae) are found on every

bank, log and standing trunk, while epiphytic species of *Polypodium* and *Elaphoglossum* appear in bewildering variety, especially in the elevations above five thousand feet. Along the single trail from Cinchona to Morce's Gap (three miles), over one hundred species of ferns can be seen without leaving the bridle-path.

Since the laboratory at Cinchona was leased by the Garden some sixteen persons have made studies at Cinchona. The writer spent two periods of several weeks each at Cinchona just prior to the date of the lease, making a study of the ferns; on the second visit he was accompanied by Mr. William R. Maxon of the U. S. National Museum, and by Dr. Johnson and Mr. Forrest Shreve from Johns Hopkins University. During the summer of 1903 Dr. D. T. MacDougal visited the station and accomplished the formal leasing of the property for the Garden.

The later students at the laboratory are as follows:

1903. Professor A. W. Evans, of Yale University, made extensive collections of the hepaticae. He was accompanied by one of his students, Mr. George E. Nichols, who made collections of the higher flora.

1904. William R. Maxon, of the U. S. National Museum, spent some time studying the ferns of Jamaica. Miss W. J. Robinson, instructor in Vassar College, spent several weeks studying the early stages of certain filmy ferns.* Miss Mary M. Brackett, of Wadleigh High School, remained during the same period, making a study of the embryology of certain Loranthaceae.†

1905. Clara E. Cummings, professor of botany in Wellesley, spent several weeks investigating the lichen-flora of the region. She was accompanied for a part of her stay by Martha E. Merrow, botanist of the Rhode Island Agricultural College. Later in the season and continuing until the late spring of 1906, Dr. Forrest Shreve, of Woman's College, Baltimore, was in

* For Miss Robinson's impression of Cinchona, *cf.* Jour. N. Y. Bot. Garden 5: 187–194. 1904.

† A popular account of Cinchona experiences is given by Miss Brackett in *The Plant World* 8: 6–12, 29–31. 1905.

charge of the laboratory and engaged in a variety of ecological and morphological studies.*

1906. Professor D. S. Johnson, of Johns Hopkins University, accompanied by two graduate students, spent some weeks at Cinchona continuing his morphological and embryological studies, especially in the Piperaceae and the Chloranthaceae. Of his students, Mr. I. F. Lewis made a study of the fresh water algae of the Blue Mountain region, collecting about fifty species representing thirty genera, of which sixteen had not hitherto been reported from the island; and Mr. W. D. Hoyt made a study of the prothallia of the Hymenophyllaceae and *Psilotum*.

Later in the season Professor A. W. Evans, of Yale University, made further studies of the hepaticae, and his assistant Mr. George E. Nichols made a study of the distribution of the mosses of the region. Both these gentlemen were in residence at Cinchona when Dr. Britton accompanied by Mrs. Britton and Miss Delia W. Marble and by the present writer made a short visit to Cinchona, of which Dr. Britton has given a fuller account in the present number of the JOURNAL. Of the sixteen botanical students that have made use of the laboratory at Cinchona, six have already made a second visit.

Already the success of the laboratory at Cinchona has justified the wisdom of the selection of this site for a laboratory. In leasing the grounds and buildings the Garden has done all that could be reasonably expected of a single institution. A well-ordered tropical laboratory is open to American botanists, easily accessible, delightful as a place of residence, surrounded by a most magnificent tropical flora offering problems without limit, and a wealth of botanical experience is now attainable by American students at a minimum expense, unattended by the ordinary discomforts and dangers common to tropical lands. If American botanists and botanical teachers really want the advantages of a tropical botanical laboratory, they now have it in their power to coöperate to make Cinchona as profitable a botanical Mecca as the famous old-world laboratory at Buitenzorg.

LUCIEN MARCUS UNDERWOOD.

COLUMBIA UNIVERSITY, October 1, 1906.

*A brief report of Dr. Shreve's work may be found in this JOURNAL, 7: 193–196. 1906.

COLLECTING IN THE MOUNTAINS WEST OF SANTIAGO, CUBA.

Dr. N. L. Britton, Director-in-Chief,

Sir: — Acting under your instructions, I left New York on the eighteenth of August for the Island of Cuba, accompanying Professor B. E. Fernow, who went for the purpose of making a forestry survey of the mountains west of Santiago. My best thanks are due Dr. Fernow for his great kindness and consideration, as well as for many practical suggestions in the field.

Arriving in Havana on the morning of the twenty-second, the Botanical Garden and University were visited; and also numerous lumber yards, so that we might become somewhat more familiar with the native woods. In the evening we left for Santiago, getting there early on the morning of the second day. Here, with the kind assistance of Mr. E. A. Whiting, we procured the necessary camp outfit, with the exception of a tent, which it was impossible to get. In the afternoon, the Museo y Biblioteca was visited, where much was learned of the Cuban woods and their rather confusing local names.

On the twenty-fifth we left for our real destination. Steaming out of the now historic harbor of Santiago, we turned to the west and cruised along the coast where the Spanish fleet was destroyed. Some forty miles to the westward we came to Chiriviquo, which was to be our headquarters for the rest of the expedition. The second floor of an old abandoned store-house, one of the two buildings in the place, made a very comfortable and tolerably dry spot to store the outfit.

Before giving a detailed itinerary of our various trips, it will render such an account more intelligible to describe some of the general features of the property.

The portion of the Sierra Maestra visited is a tract facing the Caribbean Sea and stretching from the Sevilla River on the east, some forty miles to the Peladeros, its western extremity. Its northern line is approximately the back-bone or ridge of the Sierra Maestra. This great mountain chain is considerably

farther from the coast at the eastern than at the western end of the property, but, gradually converging and continuously rising in altitude, it reaches its culminating point near El Turquino, which is readily visible from the sea. It must not be inferred from this that there is a gradual descent from the ridge of the Maestra to the coast. In reality there are numerous spurs, smaller mountain-chains, and various collections of good-sized foot-hills, which in some places altogether shut off the view of the main range, and in all places make the country exceedingly precipitous and difficult to travel.

This heterogenous group of mountains is cut up by numerous rivers, the principal ones being the Sevilla, Guama, Rio Grande, Bayamita, Ubero and the Peladeros. Of these the Sevilla, Guama, Bayamita and Peladeros take their rise in the Maestra itself, while the rest, together with some others with uncertain local names, rise in the front ranges.

The Guama is one of the largest, and at the same time one of the most typical of the general river systems of the area. At this season it disappears about two miles from the sea and flows under the ground. During the rains, however, it flows in the normal bed, and becomes sufficiently deep and swift to make it quite impassable to man or horse. At its mouth the river basin is a mile or more across and the delta of the river has dissected it into numerous islands. These are truly islands only during the rains, being merely patches of land cut out by various branches of the stream at the time of our visit. This comparatively broad river basin runs back into the interior scarcely more than three miles, when it narrows down and the whole character of the country changes. The mountains come down very sharply to the river's edge, so that the stream appears to run between two great sloping walls. One can get an idea of the meandering only by viewing it from a height, where its struggles to make its way through this chaos of mountains can be traced with some degree of accuracy. These steep river sides are cut up by many cañons, at the bottom of which one usually finds a mountain torrent.

The frequent occurrence, both in the mountains and in the river beds, of gigantic boulders of granite, add amazingly to the rugged aspect of the landscape, and incidentally to the difficulty of travel.

The climatic conditions can scarcely be discussed in such a short report, but there are two rainy seasons, one in April and May and the other in October. The wind, as in the other West Indies, is the prevailing Northeasterly Trade, and, coming as it does across the lowlands of the island, it deposits great quantities of moisture on the windward side of the Maestra. This may account for the dryness that we everywhere encountered, as long as we were in the lee of the mountain range. At this time the drought was particularly noticeable, as all the lower mountains and hills were carpeted with a bed of dried leaves.

After spending two or three days in the vicinity of Chiriviquo, learning the principal trees from our guides, we started on our first trip, which was to be an ascent of the Guama river. Along the coast there is a trail accessible to horses; but after leaving the coast line this trail disappeared. By cutting our outfit down to the essentials, however, it was possible to transport it in packs each of us carrying one; and this we did for the remainder of the expedition. Our first stop was at a point only about two miles from the shore, where the plants particularly representative of the lower river basin were collected. This might almost be considered xerophytic in character, such plants as ferns, Araceae, Piperaceae and other moisture-loving plants being absent. From here we pushed on up the river until we were seven or eight miles from the sea; and, making a favorable camp on the river bank, we made various excursions into the neighboring mountains. The collecting, however, was disappointing, as the slopes were almost completely covered with *Oxandra virgata* and a species of *Calyptranthes*. There were also some trees of the Spanish Cedar (*Cedrela odorata* L.) and Mahogany (*Swietenia Mahagoni* L.), with the ever-present *Cecropia* and *Spondias lutea*. An interesting species of *Equisetum* was found in the river bed, and a balanophoraceous parasite (*Scybalium jamaicense* Schott &

Endl.) was seen growing on the roots of *Cassia emarginata* L., at an altitude of 2,100 feet.

The first real cañon we visited presented a profusion of epiphytic and tree ferns, orchids, and other moisture-loving plants; the change from the dry slopes being very sudden and very pleasing.

Unfortunately the country at this point became so rugged that it was impossible with our outfit to continue the exploration, at least Dr. Fernow did not feel justified in further attempting the ascent of the river; and I was thus forced to give up what would doubtless have been an excellent collecting ground after the higher altitudes were reached.

Returning to the coast we went on to the Rio Grande, where much the same conditions prevailed, the river being smaller and even more impassable than the Guama. Most of the time here was spent in collecting in a subxerophytic belt between the camp and the ocean. A single day only was spent at the Rio Grande, and then we started for the Ubero. On the way we crossed a mineral spring with a copious flow of hot, and very salty, water. Among the rocks of the sea beach, live specimens were secured of a branching *Cereus*, but no flowers or fruit could be found.

At the Ubero a somewhat longer stay was made and I had the opportunity of visiting two more cañons, but at this juncture an almost daily shower interfered with the collection and preparation of specimens. Without a tent, and on an expedition where only the merest handful of dryers could be transported, the work of drying plants was by no means easy.

On the return journey Dr. Fernow stopped to look over the Bayamita River valley, while I went through to Chiriviquo, to give the specimens some much-needed attention. Afterwards I visited a mountain some seven miles away and collected many interesting plants, among them *Pinus occidentalis*, which is common in a number of places on the leeward side of the Maestra, usually below 2,300 and above 1,000 feet.

On the morning of September 15, with the lightest possible outfit, we started for the Sierra Maestra. Going up the Sevilla as far as practicable, our guides branched off, and, travelling

ridge after ridge, finally brought us to a point 3,500 feet above the sea, on the topmost ridge of the lower end of the chain. The collections that might be made here with a properly equipped botanical expedition would much more than repay the expense and difficulty of getting them out; for here the climate is very moist and the flora very rich. What might be found on the Turquino itself, or anywhere along the ridge or windward slope of the Maestra, can only be a matter of conjecture, but, judging from the glimpse we had, it would prove well worth the trouble. Only the most hurried visits could be made to the different peaks, as we were fitted out for only a four days' trip. On September the nineteenth we returned to Chiriviquo, having covered in the four days a distance of about forty miles.

No really comprehensive collection from this region was secured, but much valuable information was accumulated that will assist future explorers in the Sierra Maestra.

Leaving Chiriviquo on the twenty-third, and Santiago the next day, we arrived in New York on September thirtieth, having been absent just six weeks.

Respectfully submitted,

NORMAN TAYLOR.

PROGRESS IN CONSTRUCTION.

A contract for the construction of the rubble stone foot-bridge to replace the present wooden bridge crossing the Bronx River near the northern end of the hemlock grove, was awarded by the Commissioners of Parks on October 18, to M. J. Leahy for $11,000. This bridge will consist of five low arches, faced with large field stones selected mostly from old stone walls, which have been reserved for this purpose. The plans, prepared by Mr. John R. Brinley, landscape engineer of the garden, have received the approval of the Board of Managers, of the Commissioner of Parks for the Borough of the Bronx, and of the Municipal Art Commission. The contract time is one hundred working days. It is expected that some progress on the foundations will be made

before the end of the year, but work will have to be suspended during the winter, so it is not expected that the bridge will be completed before May or June of 1907. Its length is 172 feet and its width 15 feet.

The necessary grading preliminary to the planting of the economic garden in the north end of the valley east of the museum building has been completed, and the planting itself has been commenced. The design of this plantation is to exhibit plants whose products are utilized in the arts, sciences and industries, and they will be grouped as food plants, drug plants, fiber plants, and plants yielding other useful products. The development of this portion of the grounds opens up the whole of the long valley, the southern and middle portions of which are already occupied by herbaceous plantations.

Much progress has been made during the autumn in laying the foundations for paths in various parts of the grounds, especially in the vicinity of the lakes northeast of the museum building, at the northeast end of the fruticetum, and about the economic garden. The grading and sodding necessary in establishing the grades of these paths has also been mainly completed.

NOTES, NEWS AND COMMENT.

Dr. N. L. Britton spent a few days during the latter part of October at the National Herbarium in Washington. He was accompanied by Mr. Percy Wilson.

Dr. J. K. Small left for Southern Florida on October 23, accompanied by Mr. J. J. Carter. Dr. Small will continue his important investigations of the flora of this region, which has already yielded so much that is new and interesting.

The regular bi-weekly conferences held at the Garden on Wednesday afternoons, alternating with meetings of the Torrey Botanical Club, were inaugurated for the present season on October 17, with "Recent Explorations in Jamaica," the principal speakers being Dr. Britton, Dr. Underwood and Mrs. Britton.

Volume 7, part 1, of the North American Flora, contributed by George Perkins Clinton, appeared October 4. This part is devoted to the group of parasitic fungi popularly known as smuts (Ustilaginales), which is divided into two families, the Ustilaginaceae and the Tilletiaceae, represented in North America by nineteen genera. The fascicle includes a host-index, with page references to the species treated.

Dr. Melville T. Cook has resigned his position as chief of the department of plant pathology of the Central Agricultural Experiment Station of Cuba. He expects to devote several months to studies at the New York Botanical Garden.

Mr. Norman Taylor returned on September 30 from a trip to the Sierra Maestra Mountains, near Santiago, Cuba. He accompanied Professor B. E. Fernow, of Ithaca, N. Y., who went for the purpose of making a timber survey of this region. During a four weeks' stay in the mountains west of Santiago, collections were made for the Garden herbarium, together with some live orchids and cactuses for the conservatory.

Dr. Arthur Hollick and Professor Edward C. Jeffrey continued their joint field work in the Cretaceous deposits of the vicinity during the month of October, paying special attention to the lignitic remains found at Kreischerville, Staten Island, which were ascertained to be the best preserved for purposes of critical study. Some of this material collected during the spring was taken by Professor Jeffrey to England, where it aroused great interest among the European palaeobotanists at the meeting of the British Association for the Advancement of Science held at York last summer. A new species of *Pityoxylon*, or fossil pine wood, obtained from Kreischerville, was described by Dr. Jeffrey in the July number of the Botanical Gazette, under the name *P. staten-ense*, and more recent examination of the accompanying material has shown that several other new species of pines are represented in it.

The total rain-fall at the Garden for October was 5.81 inches. Maximum temperatures were recorded of 91° on the 9th; 95°

on the 10th; 96° on the 19th; 75° on the 28th; and 56° on the 30th; also minimum temperatures of 48° on the 2d, 5th, and 16th; 53° on the 24th; and 41° on the 31st.

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Vol. 22, part 2, issued December 18, 1905, contains descriptions of the families Saxifragaceae and Hydrangeaceae by Dr. J. K. Small and Dr. P. A. Rydberg; the Cunoniaceae, Iteaceae and Hamamelidaceae by Dr. N. L. Britton; the Pterostemonaceae by Dr. J. K. Small; the Altingiaceae by Percy Wilson and the Phyllonomaceae by Dr. H. H. Rusby.

Vol. 7, part 1, issued October 4, 1906, contains descriptions of the order Ustilaginales by G. P. Clinton.

Memoirs of the New York Botanical Garden. Price to members of the Garden, $1.00 per volume. To others, $2.00. [Not offered in exchange.]

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